

1 **TRANSMISSION DEVICE FOR A TWO DIMENSIONAL IMAGE DISPLAY**
2 **MODULE TO PROGRAMMABLY DISPLAY AN IMAGE IN THE MODULE**
3 **BACKGROUND OF THE INVENTION**

4 1. Field of the Invention

5 The present invention relates to a transmission device, and more particularly to
6 a transmission device for a two dimensional (2D) image display module to display an
7 image in the 2D image display module.

8 2. Description of Related Art

9 With reference to Figs. 6 and 7, a conventional two dimensional (2D) image
10 display module has a pattern (20) movably sandwiched between a substrate (10) and a
11 lens (30). A transmission device (40) having a cam (41) rotatably mounted on the
12 backboard plate (30) and two arms (42) pivotally connected to the lens (30). Distal ends
13 of each of the two arms (42) are connected to the cam (41) such that when the cam (41)
14 is rotated, the two arms (42) are able to pivot relative to the lens (30). Because the other
15 distal ends of the two arms (42) are engaged with the pattern (20), when the two arms
16 (42) are pivoted, the pattern (20) is moved upward and downward repeatedly. The
17 pattern (20) is thus able to present different pictures backboardd on the angle selected
18 via the lens (30).

19 It is noted from the conventional transmission device (40) that after the two
20 arms (42) are pivoted, the pattern (20) falls back to its original position by gravity. When
21 the humidity in the air becomes dense, the movement of the pattern (20) becomes
22 sluggish and sometimes may not maintain in its original space, which results in that the
23 observer can not have a very clear image in that the image presenting angle between the
24 pattern (20) and the lens (30) is mis-aligned.

25 Still further, after the pattern (20) is first inserted between the lens (30) and the

1 substrate (10), calibration of the image presenting angle between the pattern (20) and the
2 lens (30) has to be done manually. That is, the operator has to move around the pattern
3 (20) with the lens (30) fixed or the lens (30) with the pattern (20) moved so as to have
4 the best image presenting angle, which is quite troublesome and inefficient.

5 To overcome the shortcomings, the present invention intends to provide an
6 improved transmission device to mitigate or obviate the aforementioned problems.

7 SUMMARY OF THE INVENTION

8 The primary objective of the invention is to provide an improved transmission
9 device for a 2D image display module. The transmission device is securely mounted on
10 a substrate to drive either the backboard or the lens of the 2D image display module to
11 move in a desired direction such that the image is able to be presented in a desired
12 manner.

13 To accomplish the foregoing objective, the transmission device of the present
14 invention includes a step motor securely mounted on the center of the box, securing rods
15 each extending from the bottom face of the box and out of the backboard and the lens.
16 To correspond to the securing rods, the backboard has first elongated holes defined in
17 opposite sides of the backboard and the lens has second elongated holes defined in
18 opposite sides of the lens. Each of the first elongated hole corresponds to and
19 communicates with one of the second elongated holes such that the securing rods are
20 able to extend through the backboard and the lens. Each of the first elongated holes has a
21 dimension smaller than that of each of the second elongated holes.

22 Other objects, advantages and novel features of the invention will become more
23 apparent from the following detailed description when taken in conjunction with the
24 accompanying drawings.

25 BRIEF DESCRIPTION OF THE DRAWINGS

1 Fig. 1 is a perspective view of the transmission device of the present invention;

2 Fig. 2 is a side view in cross section showing the relative position between the
3 transmission device and the backboard at its first position when the transmission device
4 is driving the backboard;

5 Fig. 3 is top plan view showing the relative position between the backboard and
6 the lens when the backboard is driven by the transmission device of the present
7 invention;

8 Figs. 4 is a schematic view in cross section showing the relative position
9 between the transmission device of the present invention and the backboard after the
10 backboard is driven to move to a second position; and

11 Fig. 5 is a schematic top plan view showing that the backboard is moved to its
12 second position relative to the lens.

13 DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

14 With reference to Fig. 1, a two dimensional (2D) image display module is
15 composed of a box (50) with a top opening, a lens (70) and a backboard (60) sandwiched
16 between the lens (70) and a bottom face defining the top opening of the box (50). A
17 pattern (not shown) is normally attached to a top side of the backboard (60) to face the
18 lens (70). The transmission device in accordance with the present invention has a
19 securing member (1) and a programmable step motor (2).

20 With reference to Fig. 2 and still taking Fig. 1 for reference, the securing
21 member (1) has securing rods (11) each extending from the bottom face of the box (50)
22 and out of the backboard (60) and the lens (70). To correspond to the securing rods (11),
23 the backboard (60) has first elongated holes (61) defined in opposite sides of the
24 backboard (60) and the lens (70) has second elongated holes (71) defined in opposite
25 sides of the lens (70). Each of the first elongated hole (61) corresponds to and

1 communicates with one of the second elongated holes (71) such that the securing rods
2 (11) are able to extend through the backboard (60) and the lens (70). Each of the first
3 elongated holes (61) has a dimension smaller than that of each of the second elongated
4 holes (71).

5 The programmable step motor (20) has a driving rod (21) eccentrically formed
6 on a disk (22) which is securely formed with the motor shaft (23). The driving rod (21)
7 extends into a long hole (62) in the backboard (60) and a hole (72) in the lens (70),
8 which is shown in Fig. 3.

9 With reference to Figs. 4, 5 and taking Fig. 2 for comparison, it is noted that
10 when the programmable step motor (2) is activated and thus the driving rod (21) is
11 driven to rotate by the disk (22) to move from a first position to a second position, the
12 driving rod (21) is able to freely move in the hole (72) of the lens (70). However,
13 because of the limitation of the long hole (62) in the backboard (60), the rotational
14 movement of the eccentrically formed driving rod (21) will thus drive the backboard (60)
15 to move relative to the lens (70) from its first position to the second position. That is to
16 say, the backboard (60) is able to move up and down with respect to the lens (70) due to
17 the limitation of the long hole (62) in the backboard (60).

18 Because the movement of the backboard (60) in respect to the lens (70), the
19 picture (or pattern) sandwiched between the backboard (60) and the lens (70) is able to
20 present itself in a pre-programmed manner. That is, the picture may contain several
21 different images arranged in different positions in the picture. When the backboard (60)
22 is driven to move in different manners as a result of the program chosen from the
23 programmable step motor (2), the images may be presented in continuous sequence, in
24 alternate sequence, forwardly, backwardly...etc..

25 In summary, due to the transmission structure of the present invention, the

1 images in the picture are able to be presented via the 2D image display module in
2 different manners.

3 Even though numerous characteristics and advantages of the present invention
4 have been set forth in the foregoing description, together with details of the structure and
5 function of the invention, the disclosure is illustrative only, and changes may be made in
6 detail, especially in matters of shape, size, and arrangement of parts within the
7 principles of the invention to the full extent indicated by the broad general meaning of
8 the terms in which the appended claims are expressed.